

*Please provide the following information, and submit to the NOAA DM Plan Repository.*

**Reference to Master DM Plan (if applicable)**

*As stated in Section IV, Requirement 1.3, DM Plans may be hierarchical. If this DM Plan inherits provisions from a higher-level DM Plan already submitted to the Repository, then this more-specific Plan only needs to provide information that differs from what was provided in the Master DM Plan.*

URL of higher-level DM Plan (if any) as submitted to DM Plan Repository:

**1. General Description of Data to be Managed****1.1. Name of the Data, data collection Project, or data-producing Program:**

National Coral Reef Monitoring Program: Water Chemistry of the Coral Reefs in the Hawaiian Archipelago from Water Samples collected since 2013

**1.2. Summary description of the data:**

Water samples are collected and analyzed to assess spatial and temporal variation in the seawater carbonate systems of coral reef ecosystems in the Hawaiian and Mariana Archipelagos, American Samoa, and the Pacific Remote Island Areas as part of the NOAA National Coral Reef Monitoring Program (NCRMP).

Laboratory experiments reveal calcification rates of crustose coralline algae (CCA) are strongly correlated to seawater aragonite saturation state. Predictions of reduced coral calcification rates, due to ocean acidification, suggest that coral reef communities will undergo ecological phase shifts as calcifying organisms are negatively impacted by changing seawater chemistry.

The data described here are from water samples collected at existing, long-term monitoring sites during NOAA Pacific Islands Fisheries Science Center (PIFSC), Coral Reef Ecosystem Program (CREP) led NCRMP missions around the Hawaiian Archipelago since 2013. Two water samples are typically collected from each site—one at the reef and one at the surface directly above the reef—and a third sample may also be collected approximately 1 km offshore from the site. The samples are processed by CREP and sent to NOAA Pacific Marine Environmental Laboratory (PMEL) to be analyzed for total alkalinity (TA) and dissolved inorganic carbon (DIC). From these constituents, alongside temperature, salinity, and depth data, other constituents of the seawater carbonate system can be calculated. These monitoring data provide a baseline for tracking reef carbonate system changes due to globally increasing levels of atmospheric carbon dioxide. The data can be accessed online via the NOAA National Centers for Environmental Information (NCEI) Ocean Archive.

**1.3. Is this a one-time data collection, or an ongoing series of measurements?**

One-time data collection

**1.4. Actual or planned temporal coverage of the data:**

2013-10-18 to 2013-10-30, 2013-07-13 to 2013-07-14, 2013-08-02 to 2013-08-22, 2013-09-05 to 2013-09-18, 2015-07-31 to 2015-08-19

**1.5. Actual or planned geographic coverage of the data:**

W: -178.3864304, E: -154.8175912, N: 28.46040001, S: 18.92598792

**1.6. Type(s) of data:**

*(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)*

Table (digital)

**1.7. Data collection method(s):**

*(e.g., satellite, airplane, unmanned aerial system, radar, weather station, moored buoy, research vessel, autonomous underwater vehicle, animal tagging, manual surveys, enforcement activities, numerical model, etc.)*

Instrument: Not applicable

Platform: Not applicable

Physical Collection / Fishing Gear: Niskin bottles

**1.8. If data are from a NOAA Observing System of Record, indicate name of system:**

**1.8.1. If data are from another observing system, please specify:**

**2. Point of Contact for this Data Management Plan (author or maintainer)**

**2.1. Name:**

Annette M DesRochers

**2.2. Title:**

Metadata Contact

**2.3. Affiliation or facility:**

Pacific Islands Fisheries Science Center

**2.4. E-mail address:**

annette.desrochers@noaa.gov

**2.5. Phone number:**

(808)725-5461

**3. Responsible Party for Data Management**

*Program Managers, or their designee, shall be responsible for assuring the proper management of the data produced by their Program. Please indicate the responsible party below.*

**3.1. Name:**

Charles W Young

**3.2. Title:**

Data Steward

#### 4. Resources

*Programs must identify resources within their own budget for managing the data they produce.*

##### 4.1. Have resources for management of these data been identified?

Yes

##### 4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):

Unknown

#### 5. Data Lineage and Quality

*NOAA has issued Information Quality Guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information which it disseminates.*

##### 5.1. Processing workflow of the data from collection or acquisition to making it publicly accessible

*(describe or provide URL of description):*

Lineage Statement:

NOAA Coral Reef Ecosystem Program (CREP) assembles carbonate chemistry information from discrete seawater samples analyzed for two parameters: 1) Dissolved Inorganic Carbon (DIC), which in some literature is defined as Total Carbon (CT), and 2) Total Alkalinity (TA or AT). The carbonate system is influenced by seawater salinity, temperature, pressure, and the dissolved nutrients silicate (SiO<sub>4</sub><sup>4-</sup>) and phosphate (PO<sub>4</sub><sup>3-</sup>). All carbonate system collection and measurement methodologies follow the protocols accepted by the greater scientific community and outlined in Dickson et al. (2007)

Process Steps:

- Discrete water samples are collected according to the protocol established by the NOAA Pacific Marine Environmental Laboratory (PMEL). (Citation: Inorganic Carbon Sampling: Planning and Sample Collection)
- NOAA Coral Reef Ecosystem Program (CREP) collects supplementary salinity, temperature, and pressure values by deploying a Seabird Electronics SBE-19plus CTD in concert with every discrete seawater sample collection.
- NOAA Pacific Marine Environmental Laboratory (PMEL) supports NOAA Coral Reef Ecosystem Program's (CREP's) carbonate chemistry sampling through the laboratory analysis of dissolved inorganic carbon (DIC) and total alkalinity (TA), provision of the sample bottles and transport cases, and technical consultation. The source document contains the protocols that PMEL uses to analyze water samples for DIC and TA. (Citation: Dickson, A.G., Sabine, C.L. and Christian, J.R. (Eds.) 2007. Guide to best practices for ocean CO<sub>2</sub> measurements. PICES Special Publication 3, 191 pp.)
- The Total Alkalinity (TA) analysis employs a two-stage, potentiometric, open-cell titration using coulometrically analyzed HCl. (Citation: Dickson et al (2007), SOP 3b: Determination of total alkalinity in sea water using an open-cell titration)

**5.1.1. If data at different stages of the workflow, or products derived from these data, are subject to a separate data management plan, provide reference to other plan:**

**5.2. Quality control procedures employed (describe or provide URL of description):**

PMEL conducts quality assurance and quality control on their analyses; the precision and accuracy of DIC analyses are on the order of  $\pm 0.05\%$  and TA analyses are on the order of  $\pm 0.1\%$  in a laboratory setting.

Data quality flags are provided by NOAA Pacific Marine Environmental Laboratory (PMEL) and included in the dataset. These flags indicate if something went wrong with the analytical equipment or with the processing of the samples. PMEL uses the World Ocean Circulation Experiment (WOCE) data quality flag system, where '2's correspond to good values, '3's to questionable data, and '4's to bad data. Most water samples collected by the NOAA Coral Reef Ecosystem Program (CREP) and analyzed by PMEL in this dataset received a '2' data quality flag and the remainder were flagged as questionable ('3').

## **6. Data Documentation**

*The EDMC Data Documentation Procedural Directive requires that NOAA data be well documented, specifies the use of ISO 19115 and related standards for documentation of new data, and provides links to resources and tools for metadata creation and validation.*

**6.1. Does metadata comply with EDMC Data Documentation directive?**

Yes

**6.1.1. If metadata are non-existent or non-compliant, please explain:**

**6.2. Name of organization or facility providing metadata hosting:**

NMFS Office of Science and Technology

**6.2.1. If service is needed for metadata hosting, please indicate:**

**6.3. URL of metadata folder or data catalog, if known:**

<https://inport.nmfs.noaa.gov/inport/item/36067>

**6.4. Process for producing and maintaining metadata**

*(describe or provide URL of description):*

Metadata produced and maintained in accordance with the NMFS Data Documentation Procedural Directive: <http://www.nmfs.noaa.gov/op/pds/documents/04/111/04-111-01.pdf>

## **7. Data Access**

*NAO 212-15 states that access to environmental data may only be restricted when distribution is explicitly limited by law, regulation, policy (such as those applicable to personally identifiable*

*information or protected critical infrastructure information or proprietary trade information) or by security requirements. The EDMC Data Access Procedural Directive contains specific guidance, recommends the use of open-standard, interoperable, non-proprietary web services, provides information about resources and tools to enable data access, and includes a Waiver to be submitted to justify any approach other than full, unrestricted public access.*

**7.1. Do these data comply with the Data Access directive?**

Yes

**7.1.1. If the data are not to be made available to the public at all, or with limitations, has a Waiver (Appendix A of Data Access directive) been filed?**

**7.1.2. If there are limitations to public data access, describe how data are protected from unauthorized access or disclosure:**

**7.2. Name of organization of facility providing data access:**

National Centers for Environmental Information - Silver Spring, Maryland

**7.2.1. If data hosting service is needed, please indicate:**

**7.2.2. URL of data access service, if known:**

<http://accession.nodc.noaa.gov/0131502>

<http://accession.nodc.noaa.gov/0131502>

<http://accession.nodc.noaa.gov/0131502>

<http://accession.nodc.noaa.gov/0157714>

<http://accession.nodc.noaa.gov/0160330>

**7.3. Data access methods or services offered:**

Data can be accessed online via the NOAA National Centers for Environmental Information (NCEI) Ocean Archive.

**7.4. Approximate delay between data collection and dissemination:**

Unknown

**7.4.1. If delay is longer than latency of automated processing, indicate under what authority data access is delayed:**

**8. Data Preservation and Protection**

*The NOAA Procedure for Scientific Records Appraisal and Archive Approval describes how to identify, appraise and decide what scientific records are to be preserved in a NOAA archive.*

**8.1. Actual or planned long-term data archive location:**

*(Specify NCEI-MD, NCEI-CO, NCEI-NC, NCEI-MS, World Data Center (WDC) facility, Other, To Be Determined, Unable to Archive, or No Archiving Intended)*

NCEI-MD

**8.1.1. If World Data Center or Other, specify:**

**8.1.2. If To Be Determined, Unable to Archive or No Archiving Intended, explain:**

**8.2. Data storage facility prior to being sent to an archive facility (if any):**

Pacific Islands Fisheries Science Center - Honolulu, HI

**8.3. Approximate delay between data collection and submission to an archive facility:**

Unknown

**8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?**

*Discuss data back-up, disaster recovery/contingency planning, and off-site data storage relevant to the data collection*

NOAA IRC and NOAA Fisheries ITS resources and assets.

## **9. Additional Line Office or Staff Office Questions**

*Line and Staff Offices may extend this template by inserting additional questions in this section.*